MINUTES OF DOT-AGC BRIDGE DESIGN SUBCOMMITTEE MEETING

The DOT-AGC Joint Bridge Design Subcommittee met on October 8th, 2003. Those in attendance were:

Greg Perfetti	State Bridge Design Engineer (Co-Chairman)
Allen Raynor	Assistant State Bridge Design Engineer
Paul Lambert	Structure Design Project Engineer
Tom Koch	Structure Design Project Engineer
John Erwin	Structure Design Project Design Engineer
Chris Britton	Taylor and Murphy Construction Co.
Richard Holshouser	Sanford Contractors, Inc.
Mark Lively	Crowder Construction
Michael Dane	Dane Construction, Inc.
David Harris	State Roadside Erosion Control & Vegetation Management Engineer - REU
Barney Blackburn	Soil & Water Operations Engineer - REU
Gichuru Muchane	Structure Design Engineer

At the opening of the meeting Mr. Perfetti welcomed Mr. Chris Britton of Taylor and Murphy. Mr. Perfetti also informed the committee that Mr. Hancock would not attend the meeting due to an emergency that had arisen just prior to the meeting.

During the review of the minutes of the August 13th, 2003 meeting, the following items were discussed:

1. *Drilled Shafts*
   Mr. Erwin reported that representatives from the Structure Design Unit, Geotechnical Unit and Construction Unit had recently met to finalize changes to be made to Unit policies in regard to the requests of the Association of Drilled Shaft Contractors (ADSC). A letter describing the revised policies will be sent to the ADSC and presented at the next meeting.

   Mr. Dane inquired whether there was an existing policy on the waiting period for pouring the concrete for columns above drilled shafts once the shaft has been constructed. It was felt that Mr. Hancock was the best person to respond to this question. In his absence, this question was deferred to the next meeting.

2. *Pile Hammer Energies*
   Mr. Perfetti reported that he had discussed the issue of specifying pile hammer energies with Mr. Njoroge Wainaina, State Geotechnical Engineer, and Mr. K.J. Kim, Eastern Regional Geotechnical Manager. They both felt that specifying a pile hammer range is necessary to prevent overdriving the piles. In addition, they noted that the minimum pile hammer energy detailed on the plans is sufficient to drive the piles. The contractors stated that in some instances the pile hammer energy range detailed in the plans is so large that different equipment would be necessary to drive

the piles depending on the actual energy required. This makes bidding very difficult for the contractors.

3. *Precast Culverts*
   Mr. Koch reported on the success and excellent quality of work on a recent precast pedestrian culvert project. This project demonstrated that contractors can overcome the common fit-up problems that have been experience in the past. *Mr. Koch stated that Structure Design will review the policy on the use of precast culverts to determine if it is too restrictive.*

The Minutes of the August 13th, 2003 meeting were approved.

The following items of new business were discussed:

1. *Culvert Diversion*
   Contractors had requested that all culvert diversion work be paid for on a lump sum basis rather than on a per linear foot basis in addition to various other pay items. The lump sum method of payment would provide contractors the flexibility to complete the culvert diversion in the most efficient way. Mr. Harris, stated that the Roadside Environmental Unit did not have any objections to this change, and he would look into making this change. However, he also advised the committee that the regulatory agencies often require specific details on the construction sequence of the culvert diversion before issuing permits. Mr. Harris stated that since the permits are issued based on the culvert diversion shown on the plans, any changes may require a new permit. In addition Mr. Harris noted that changes to what is shown on the plans might require the contractors to assume the risk of additional post-bid work if, for example, the regulatory agency field inspectors feel that the revised diversion channel is inadequate. Mr. Holshouser stated the if a new permit is required, then it was probably best for the contractors to stick to the culvert diversion as shown on the plans.

2. *Pour sequence*
   Mr. Erwin distributed a copy of a policy memorandum dated September 10, 2003, which details an optional pouring sequence for all prestressed concrete girder superstructure bridges designed continuous for live load. Contractors were in favor of the optional pouring sequence.

3. *Slope Protection Elevations*
   Contractors had requested that Structure Design show two elevations along the slope protection ditchline. These elevations will allow the contractors to stake out the slope protection prior to the roadway section being completed. *Mr. Erwin proposed that Structure Design show the elevations and offsets at the ditchline directly below each of the exterior girders,* since these elevations are readily available in the bridge superstructure design file. *Structure Design committed to showing the elevations and, at the contractors' request, the offset distances from the road under centerline at each of those locations.*

4. *Slip-Forming Barrier Rails*
   At the request of the NCDOT's Construction Unit, the New Jersey shape barrier rail width was increased from 1'-5" to 1'-6" (432 mm to 457 mm) in order to provide 3" (76 mm) of clear distance from the back of the barrier rail to the reinforcement. This change decreased the bridge deck overhang on the backside of the barrier rail from 1½" to a ½" chamfered overhang. This policy has been in effect since May 7, 2003.

   Ms. Diane Highsmith, President – Watts Barrier Walls, has communicated some concerns regarding this change to Mr. Perfetti. Ms. Highsmith's specific concerns are:

   i. A concrete cover in excess of 2-2½" may cause the concrete cover to fall off especially when the concrete mix contains flyash,
   ii. Contractors need the 1½" overhang to account for irregularities in the bridge deck when slip-forming the barrier rail, and
   iii. She requests that if the 1½" overhang is eliminated, then the ½" chamfer should also be eliminated.

   Mr. Holshouser agreed to discuss any concerns with the barrier rail dimensions with Boss Construction and other barrier rail subcontractors.

   Mr. Britton suggested that the ½" chamfer should be increased to a ¾" chamfer. The committee agreed that the increased barrier rail will ensure adequate cover for the reinforcing steel, and the ½" chamfer was necessary for aesthetic reasons.

5. *Overhang Falsework Research Presentation*
   Mr. Erwin proposed inviting Dr. Emmett Sumner to make a presentation to contractors and consulting engineers that design and detail overhang falsework plans. Dr. Sumner is the lead investigator on a Department funded overhang falsework research project currently underway at NC State University. The presentation and meeting would give contractors and engineers a chance to comment on the proposed research.

   It was agreed that the presentation would be made as soon as possible, but no later than the December DOT-AGC meeting. Consulting engineers and engineering firms to be invited will include Triplett King, Ralph Whitehead, and Dave Wissell.

6. *Cleaning Weathering Steel*
   Mr. Erwin, speaking on behalf of Mr. Hancock, presented some concerns that were raised by Mr. Ronald Shaw of Lee Construction Co. Specifically these concerns are:

   i. Cleaning weathering steel girders at the end of the project makes it difficult to obtain a uniform surface. Mr. Shaw suggests that girders should be protected during placement of the superstructure concrete and cleaned or sand blasted, as necessary, within two months. The girders should then be accepted with no further cleaning required.

ii. Contractors spend a lot of time revisiting the project site due to numerous punch lists. Typically they must satisfy the Project Inspector's, Resident Engineer's, and Division Construction Engineer's punch lists. They request that all inspectors coordinate their inspections and present the contractor with one list so that the required work can be performed at one time.

iii. Inspectors have requested contractors to clean the rust stains on the substructure several times during the contract period. Contractors would like the Department to authorize the use of stain resisting/prevention products or advise the inspectors that stained substructures are not an issue.

The committee agreed that stained substructures are not aesthetically pleasing. Mr. Britton stated that his company does use a stain-guard product and it is more economical and feasible than cleaning.

All of these issues will be discussed at the next meeting with Mr. Hancock.

7. *Other Business*

i. Box-Girder

Mr. Koch presented a box-girder section that Structure Design is considering adopting. This type of girder would provide the capacity to span at least 60' and permit top-down construction.

Mr. Lively stated that some other states have used similar box girders and they are very expensive, but he anticipates the price will decrease with more widespread use of the product.

Mr. Holshouser stated that contractors typically use a 65-ton crane (weighing approximately 100,000 lbs.) on top-down construction projects. This type of crane can drive steel or composite piles to a 50-ton capacity. Piles that require driving to a higher capacity may require a larger crane. For this reason, Mr. Holshouser suggested that Structure Design limit the pile capacity to 50 tons for top-down construction. Mr. Perfetti stated that a 50-ton pile capacity is used for all "B" projects.

Mr. Dane requested that Structure Design provide guidance within the plans and contract on the allowable loads on the bridge during construction. *The Structure Design Unit committed to investigating this matter and reporting back to the committee.*

ii. Approach Slabs

Mr. Erwin informed the committee that Structure Design's approach slab standard would soon be revised. The major revisions will include:

a. A 25' minimum length,
b. Squaring off the roadway end of the approach slab for skews between 60^{o} and 120^{o}, and

c. Fixing the roadway end of the approach slab at 60^o for all skews less than 60^o and 120^o for all skews greater than 120^o.

Mr. Erwin inquired whether contractors required additional construction elevations other than those we currently provide. He also inquired if they had a preference of either the 6" ABC or 5" concrete sub-base options. Contractors stated that the construction elevations currently provided are satisfactory. However, if the approach slab section includes crown breaks, then elevations should be given along those breaks. The contractors also requested that Structure Design leave the sub-base type as an option, but they questioned the need for a sub-base over the reinforced select material. *Mr. Erwin stated that he would discuss this requirement with Mr. Hancock and report back to the committee.*

Mr. Erwin also alerted the contractors that approach slabs constructed by the new standards will be trapezoidal and the reinforcement will consist of numerous cut-bars.

iii. Epoxy Coated Reinforcing Steel

Mr. Perfetti stated that he was considering eliminating the requirement of epoxy coated rebar in bridge deck slabs. He suggested that plain rebar embedded in high quality concrete would yield a similar performance at a lower cost. Contractors were in favor of eliminating the epoxy coated rebar because there would be additional time and cost savings in ordering and handling the rebar.

8. Next Meeting

The next meeting is scheduled for December 10^{th}, 2003 in the Structure Design Unit conference Room C.